

Appendix F: Message Database

1.0 Introduction

This appendix contains the estimated message data expected to be transferred during DSRC sessions. Each message is part of a set that makes up a transaction. A transaction (message set) is a complete communications session that implements a data transfer between the roadside and a vehicle. It usually consists of the following sequence of events:

- The roadside device sends a message to the vehicle requesting data;
- The vehicle device responds with data;
- The roadside device sends a message adding data to the vehicle system;
- The vehicle device confirms that the data was received; and
- The roadside device sends a sign off notification.

However, transactions sometimes consist of only three messages. When the data flow does not need confirmation, three messages are used as follows:

- The roadside device sends a message to the vehicle requesting data;
- The vehicle device responds with data; and
- The roadside device sends a sign off notification.

A special case exists for some transactions, i.e., in-vehicle signing. These transactions may send a single message to all vehicles, as a broadcast, and do not request confirmation. This is a special case of data transfer for transaction types that already have message sets with three or five messages. The single message variant is not listed because it does not increase the number of transaction types or affect the maximum estimated data rate.

2.0 Message Map

The message map (MSG_MAP) is a database that contains information about the DSRC messages. Each record (row) contains information about a single message in the database. The database fields and information content are listed below:

- ID - Database row number;
- Physical Flow - Transaction name from Architecture documents;
- Architecture Flow - Architecture Flow name from Architecture documents;
- Message - Message name; from CVO User Requirements or ARINC Estimate;
- Src - Source;
- Dst - Destination;
- Data Element and Data Size, in bits, numbered 1 to 25; and
- Message Size; the sum of the data sizes in the row.

Architecture names do not exist for all the messages because the message structures were developed from additional analysis performed to produce the CVO User's Requirements and from additional ARINC analysis. Also, the 25 Data Element and Size fields exist to accommodate the maximum number of data elements assigned to a message. The fields are only filled in for the data proposed for each message. Therefore, a large number of the Data Element fields are blank and many of the Size fields contain zeroes.

The Data Element fields represent the content of the messages and follow format as described below (and illustrated in figure 1):

Header Code - The Header defines the start of each message and consists of an 8-bit self-synchronization pattern (Selsyn) and an 4-bit start-of-message flag for a total of 12 bits.

Transaction Code - 16 bit word indicating message purpose. There will be a specific code for each of the data structures listed below. This code will also provide an indication of which version of the message is required.

Message Length - 12 bit field that contains the length of the message in bytes. The byte count includes the cyclic redundancy check (CRC) but not the message length or transaction code.

Message Text - Variable length; Data Elements; sources described below.

CRC - 16 bit word used to detect errors in message transmission. (Although it is included in this discussion of messages, it is actually associated with the communication protocol.)

Header	Transaction Code	Message Length	Message Text	Cyclic Redundancy Check
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Figure 1 Data Structure Format

The data elements listed as part of the Message Text were assembled from the Dedicated Short Range Communications Requirements For Commercial Vehicle Operations [1], the ITS Architecture Dedicated Short Range Communications Standards Requirements Package [2] the ITS Logical Architecture [3] and ARINC forecasts of data requirements. The maximum message size is usually in the range of 512 bits. Many messages fall in this range. Those messages that are larger than 512 bits would be divided into separate messages in actual operation. However, in order to maintain model simplicity, the approach used in this analysis retains all related data in a single message.

Two messages that are used by multiple message sets are listed below. See the referenced documents for details about the other messages and data elements:

Acknowledgment - This data structure is transmitted by the tag to confirm the reception and write into memory of messages transmitted by the roadside. It includes an 8 bit field that provides the confirmation as well as error diagnosis.

(data element - **Operation_Status**)

Sign-off - This data structure is transmitted by the roadside to end a communication session. It includes an 8 bit field that indicates the duration of time the tag should be deactivated so that it will not attempt to respond to the current reader's request to initiate a transaction. (data element - **Time_Out**)

References

- [1] Yuan, R, Johns Hopkins University Applied Physics Laboratory, Draft Dedicated Short Range Communications Requirements For Commercial Vehicle Operations Version 2.0, February 1996.
- [2] Loral Federal Systems/Rockwell International, ITS Architecture, Dedicated Short Range Communications Standards Requirements Package, January 1996.
- [3] Loral Federal Systems/Rockwell International, ITS Architecture, Logical Architecture, April 1996.

MSG_MAP

ID	Physical Flow	Architecture Flow	Message	Message Size
1	toll payment	request tag data	Payment ID Request	72
2	toll payment	tag data	Payment ID	240
3	toll payment	tag update	Transaction Status	124
4	parking payment	request tag data	Payment ID Request	72
5	parking payment	tag data	Payment ID	240
6	parking payment	tag update	Transaction Status	124
7	obtain parking fee	request tag data	Payment ID Request	72
8	obtain parking fee	tag data	Obtain Parking Fee	80
9	obtain parking fee	tag update	Parking Fee	124
10	drive-thru_payment		Payment ID Request	232
11	drive-thru_payment	tag data	Payment ID	232
12	drive-thru_payment		Transaction Status	276
13	roadway sign info		Vehicle ID Request	72
14	roadway sign info		Vehicle ID	175
15	roadway sign info	vehicle signage data	Electronic Signage	136
16	entry/exit permission		Gate Access ID Request	72
17	entry/exit permission		Gate Access ID Response	175
18	entry/exit permission		Gate Access Response & Sign_off	72
19	on board safety data	on board safety request	On_Board_Safety_Data_Request	56
20	on board safety data	on board safety data	On_Board_Safety_Data_Response	162
21	border clearance request	border clearance request	CV Border Clearance Request	88
22	border clearance request	border clearance data	CV Border Clearance Data	200
23	border clearance request	pass/pull-in & border clearance event record	CV Border Clearance Event	131
24	lock tag data	lock tag data request	Lock Request	56
25	lock tag data	lock tag data	Lock Data	109
26	CV screening request	screening request	CV Screening Request	88
27	CV screening request	screening data	CV Screening Data	1042
28	CV screening request	pass/pull-in & clearance event record	CV Screening Event	310
29	safety inspection record	on board safety request	CV Inspection Request	88
30	safety inspection record	on board safety data	CV Inspection Data	151
31	safety inspection record	pass/pull-in	CV Inspection Event	156
32	Driver's Daily Log		Driver's Daily Log Request	72
33	Driver's Daily Log		Driver's Daily Log	180
34	signal preemption request		Vehicle ID Request	72
35	signal preemption request	emergency vehicle preemption request	Vehicle ID	88
36	signal preemption request		Signal Preemption Response	104

MSG_MAP

ID	Src	Dst	Data Element 1	Size 1	Data Element 2	Size 2	Data Element 3	Size 3	Data Element 4	Size 4
1	TCS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
2	VS	TCS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
3	TCS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
4	PMS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
5	VS	PMS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
6	PMS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
7	PMS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
8	VS	PMS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
9	PMS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
10	RS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
11	VS	RS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
12	RS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
13	RS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
14	VS	RS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
15	RS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
16	RS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
17	VS	RS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
18	RS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
19	CVCS	CVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
20	CVS	CVCS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
21	CVCS	CVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
22	CVS	CVCS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
23	CVCS	CVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
24	CVCS	CVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
25	CVS	CVCS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
26	CVCS	CVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
27	CVS	CVCS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
28	CVCS	CVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
29	CVCS	CVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
30	CVS	CVCS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
31	CVCS	CVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
32	CVCS	CVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
33	CVS	CVCS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
34	RS	EVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
35	EVS	RS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
36	RS	EVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12

MSG_MAP

ID	Data Element 5	Size 5	Data Element 6	Size 6	Data Element 7	Size 7
1	State/Region	8	Group/Agency	8	CRC	16
2	Vehicle_Type	4	Vehicle_Profile	4	Vehicle_AXles	4
3	Group/Agency	8	Plaza_ID	7	Lane_ID	5
4	State/Region	8	Group/Agency	8	CRC	16
5	Vehicle_Type	4	Vehicle_Profile	4	Vehicle_AXles	4
6	Group/Agency	8	Plaza_ID	7	Lane_ID	5
7	State/Region	8	Group/Agency	8	CRC	16
8	Vehicle_Type	4	Vehicle_Profile	4	Vehicle_AXles	4
9	Group/Agency	8	Plaza_ID	7	Lane_ID	5
10	Company-ID	160	Charge_Amount	16	CRC	16
11	Payment_Amount	16	Payment_ID	160	CRC	16
12	Company-ID	160	Payment_Amount	16	Plaza_ID	7
13	State/Region	8	Group/Agency	8	CRC	16
14	Vehicle_Identification_Number	119	CRC	16		0
15	Electronic Signage	80	CRC	16		0
16	State/Region	8	Group/Agency	8	CRC	16
17	Vehicle_Identification_Number	119	CRC	16		0
18	entry/exit permission	8	Time_Out	8	CRC	16
19	CRC	16		0		0
20	Wheel-Based_Vehicle_Speed	24	Engine_Speed	16	Anti-lock_Brake_Active	2
21	Roadside_ID	32	CRC	16		0
22	Trip_ID	60	Roadside_ID	32	Roadside_Date	9
23	Roadside_ID	32	Roadside_Date	9	Roadside_Time	11
24	CRC	16		0		0
25	Roadside_ID	32	Roadside_Date	9	Roadside_Time	11
26	Roadside_ID	32	CRC	16		0
27	Carrier_Unique_ID	96	Vehicle_VIN_Power_Unit	102	Vehicle_VIN_Other_Components	102
28	Roadside_ID	32	Roadside_Date	9	Roadside_Time	11
29	Roadside_ID	32	CRC	16		0
30	Roadside_ID	32	Roadside_Date	9	Roadside_Time	11
31	Roadside_ID	32	Roadside_Date	9	Roadside_Time	11
32	State/Region	8	Group/Agency	8	CRC	16
33	Driver_Screening_Identification	92	Hours_in_service	16	Hours_resting	16
34	State/Region	8	Group/Agency	8	CRC	16
35	Signal Preemption Request	2	Time	18	Agency_Specific_Data	12
36	Password	18	Reader_ID	12	Seconds	18

MSG_MAP

ID	Data Element 8	Size 8	Data Element 9	Size 9	Data Element 10	Size 10	Data Element 11
1		0		0		0	
2	Agency_Specific_Data	12	Fare_Payment_ID	160	CRC	16	
3	Seconds	32	Fare_Payment_Amount	16	CRC	16	
4		0		0		0	
5	Agency_Specific_Data	12	Fare_Payment_ID	160	CRC	16	
6	Seconds	32	Fare_Payment_Amount	16	CRC	16	
7		0		0		0	
8	Agency_Specific_Data	12	CRC	16		0	
9	Seconds	32	Fare_Payment_Amount	16	CRC	16	
10		0		0		0	
11		0		0		0	
12	Lane_ID	5	Seconds	32	CRC	16	
13		0		0		0	
14		0		0		0	
15		0		0		0	
16		0		0		0	
17		0		0		0	
18		0		0		0	
19		0		0		0	
20	Tire_Temperature (bits per tire)	16	Tire_Pressure (bits per tire)	8	Brake_Application_Pressure	8	Brake_Primary_Pressure
21		0		0		0	
22	Roadside_Time	11	Trip_Vehicle_Gross_Weight	12	Trip_Cargo_Release_Status	1	Trip_Vehicle_Release_Status
23	Trip_Vehicle_Gross_Weight	12	Trip_Cargo_Release_Status	1	Trip_Vehicle_Release_Status	1	Trip_Driver_Release_Status
24		0		0		0	
25	Shipment_Lock_Status	1	CRC	16		0	
26		0		0		0	
27	Vehicle_VIN_Other_Components	102	Vehicle_VIN_Other_Components	102	License_Number	174	Shipment_Type
28	Trip_Vehicle_Gross_Weight	12	Trip_Vehicle_Num_Axes	4	Trip_Vehicle_Wgt_Axle1	12	Trip_Vehicle_Wgt_Axle2
29		0		0		0	
30	Vehicle_Inspection_Level	6	Vehicle_CVSA_Certification_Flag	1	Vehicle_CVSA_Expire_Date	36	CRC
31	Vehicle_Inspection_Level	6	Vehicle_CVSA_Certification_Flag	6	Vehicle_CVSA_Expire_Date	36	VCRC
32		0		0		0	
33	CRC	16		0		0	
34		0		0		0	
35	CRC	16		0		0	
36	CRC	16		0		0	

MSG_MAP

ID	Size 11	Data Element 12	Size 12	Data Element 13	Size 13	Data Element 14	Size 14
1	0		0		0		0
2	0		0		0		0
3	0		0		0		0
4	0		0		0		0
5	0		0		0		0
6	0		0		0		0
7	0		0		0		0
8	0		0		0		0
9	0		0		0		0
10	0		0		0		0
11	0		0		0		0
12	0		0		0		0
13	0		0		0		0
14	0		0		0		0
15	0		0		0		0
16	0		0		0		0
17	0		0		0		0
18	0		0		0		0
19	0		0		0		0
20	8	Brake_Secondary_Pressure	8	Hydraulic_Retarder_Pressure	8	Steering_Axle_Temperature	8
21	0		0		0		0
22	1	Trip_Driver_Release_Status	1	Driver_Signalling	8	CRC	16
23	1	Driver_Signalling	8	CRC	16		0
24	0		0		0		0
25	0		0		0		0
26	0		0		0		0
27	6	Vehicle_CVSA_Expire_Date	24	Roadside_Date	24	Roadside_ID	32
28	12	Trip_Vehicle_Wgt_Axle3	12	Trip_Vehicle_Wgt_Axle4	12	Trip_Vehicle_Wgt_Axle5	12
29	0		0		0		0
30	16		0		0		0
31	16		0		0		0
32	0		0		0		0
33	0		0		0		0
34	0		0		0		0
35	0		0		0		0
36	0		0		0		0

MSG_MAP

ID	Data Element 15	Size 15	Data Element 16	Size 16	Data Element 17	Size 17	Data Element 18	Size 18
1		0		0		0		0
2		0		0		0		0
3		0		0		0		0
4		0		0		0		0
5		0		0		0		0
6		0		0		0		0
7		0		0		0		0
8		0		0		0		0
9		0		0		0		0
10		0		0		0		0
11		0		0		0		0
12		0		0		0		0
13		0		0		0		0
14		0		0		0		0
15		0		0		0		0
16		0		0		0		0
17		0		0		0		0
18		0		0		0		0
19		0		0		0		0
20	CRC	16		0		0		0
21		0		0		0		0
22		0		0		0		0
23		0		0		0		0
24		0		0		0		0
25		0		0		0		0
26		0		0		0		0
27	Roadside_Date	9	Roadside_Time		11 Trip_Vehicle_Gross_Weight		12 Trip_Vehicle_Num_Axes	4
28	Trip_Vehicle_Wgt_Axle6	12	Trip_Vehicle_Wgt_Axle7		12 Trip_Vehicle_Wgt_Axle8		12 Trip_Vehicle_Wgt_Axle9	12
29		0		0		0		0
30		0		0		0		0
31		0		0		0		0
32		0		0		0		0
33		0		0		0		0
34		0		0		0		0
35		0		0		0		0
36		0		0		0		0

MSG_MAP

ID	Data Element 19	Size 19	Data Element 20	Size 20	Data Element 21	Size 21	Data Element 22	Size 22
1		0		0		0		0
2		0		0		0		0
3		0		0		0		0
4		0		0		0		0
5		0		0		0		0
6		0		0		0		0
7		0		0		0		0
8		0		0		0		0
9		0		0		0		0
10		0		0		0		0
11		0		0		0		0
12		0		0		0		0
13		0		0		0		0
14		0		0		0		0
15		0		0		0		0
16		0		0		0		0
17		0		0		0		0
18		0		0		0		0
19		0		0		0		0
20		0		0		0		0
21		0		0		0		0
22		0		0		0		0
23		0		0		0		0
24		0		0		0		0
25		0		0		0		0
26		0		0		0		0
27	Trip_Vehicle_Wgt_Axle1	12	Trip_Vehicle_Wgt_Axle2	12	Trip_Vehicle_Wgt_Axle3	12	Trip_Vehicle_Wgt_Axle4	12
28	Trip_Vehicle_Axle_Space12	8	Trip_Vehicle_Axle_Space23	8	Trip_Vehicle_Axle_Space34	8	Trip_Vehicle_Axle_Space45	8
29		0		0		0		0
30		0		0		0		0
31		0		0		0		0
32		0		0		0		0
33		0		0		0		0
34		0		0		0		0
35		0		0		0		0
36		0		0		0		0

MSG_MAP

ID	Data Element 23	Size 23	Data Element 24	Size 24	Data Element 25	Size 25	Data Element 26
1		0		0		0	
2		0		0		0	
3		0		0		0	
4		0		0		0	
5		0		0		0	
6		0		0		0	
7		0		0		0	
8		0		0		0	
9		0		0		0	
10		0		0		0	
11		0		0		0	
12		0		0		0	
13		0		0		0	
14		0		0		0	
15		0		0		0	
16		0		0		0	
17		0		0		0	
18		0		0		0	
19		0		0		0	
20		0		0		0	
21		0		0		0	
22		0		0		0	
23		0		0		0	
24		0		0		0	
25		0		0		0	
26		0		0		0	
27	Trip_Vehicle_Wgt_Axle5	12	Trip_Vehicle_Wgt_Axle6	12	Trip_Vehicle_Wgt_Axle7	12	Trip_Vehicle_Wgt_Axle8
28	Trip_Vehicle_Axle_Space56	8	Trip_Vehicle_Axle_Space67	8	Trip_Vehicle_Axle_Space78	8	Trip_Vehicle_Axle_Space89
29		0		0		0	
30		0		0		0	
31		0		0		0	
32		0		0		0	
33		0		0		0	
34		0		0		0	
35		0		0		0	
36		0		0		0	

MSG_MAP

ID	Data Element 27	Size 27	Data Element 28	Size 28	Data Element 29	Size 29	Data Element 30	Size 30
1		0		0		0		0
2		0		0		0		0
3		0		0		0		0
4		0		0		0		0
5		0		0		0		0
6		0		0		0		0
7		0		0		0		0
8		0		0		0		0
9		0		0		0		0
10		0		0		0		0
11		0		0		0		0
12		0		0		0		0
13		0		0		0		0
14		0		0		0		0
15		0		0		0		0
16		0		0		0		0
17		0		0		0		0
18		0		0		0		0
19		0		0		0		0
20		0		0		0		0
21		0		0		0		0
22		0		0		0		0
23		0		0		0		0
24		0		0		0		0
25		0		0		0		0
26		0		0		0		0
27	Trip_Vehicle_Wgt_Axle9	12	Trip_Vehicle_Axle_Space12	8	Trip_Vehicle_Axle_Space23	8	Trip_Vehicle_Axle_Space34	8
28	Trip_Vehicle_Scale_Quality	4	Clearance_Screening_Bypass_Flag	8	Vehicle_oss_Flag	1	Driver_oss_Flag	1
29		0		0		0		0
30		0		0		0		0
31		0		0		0		0
32		0		0		0	.	0
33		0		0		0		0
34		0		0		0		0
35		0		0		0		0
36		0		0		0		0

MSG_MAP

ID	Data Element 31	Size 31	Data Element 32	Size 32	Data Element 33	Size 33	Data Element 34	Size 34
1		0		0		0		0
2		0		0		0		0
3		0		0		0		0
4		0		0		0		0
5		0		0		0		0
6		0		0		0		0
7		0		0		0		0
8		0		0		0		0
9		0		0		0		0
10		0		0		0		0
11		0		0		0		0
12		0		0		0		0
13		0		0		0		0
14		0		0		0		0
15		0		0		0		0
16		0		0		0		0
17		0		0		0		0
18		0		0		0		0
19		0		0		0		0
20		0		0		0		0
21		0		0		0		0
22		0		0		0		0
23		0		0		0		0
24		0		0		0		0
25		0		0		0		0
26		0		0		0		0
27	Trip_Vehicle_Axle_Space45	8	Trip_Vehicle_Axle_Space56	8	Trip_Vehicle_Axle_Space67	8	Trip_Vehicle_Axle_Space78	8
28	CRC	16		0		0		0
29		0		0		0		0
30		0		0		0		0
31		0		0		0		0
32		0		0		0		0
33		0		0		0		0
34		0		0		0		0
35		0		0		0		0
36		0		0		0		0

MSG_MAP

ID	Data Element 35	Size 35	Data Element 36	Size 36	Data Element 37	Size 37	Data Element 38	Size 38
1		0		0		0		0
2		0		0		0		0
3		0		0		0		0
4		0		0		0		0
5		0		0		0		0
6		0		0		0		0
7		0		0		0		0
8		0		0		0		0
9		0		0		0		0
10		0		0		0		0
11		0		0		0		0
12		0		0		0		0
13		0		0		0		0
14		0		0		0		0
15		0		0		0		0
16		0		0		0		0
17		0		0		0		0
18		0		0		0		0
19		0		0		0		0
20		0		0		0		0
21		0		0		0		0
22		0		0		0		0
23		0		0		0		0
24		0		0		0		0
25		0		0		0		0
26		0		0		0		0
27	Trip_Vehicle_Axle_Space89	8	Trip_Vehicle_Scale_Quality	4	Clearance_Screening_Bypass_Flag	8	Vehicle_oos_Flag	1
28		0		0		0		0
29		0		0		0		0
30		0		0		0		0
31		0		0		0		0
32		0		0		0	.	0
33		0		0		0		0
34		0		0		0		0
35		0		0		0		0
36		0		0		0		0

MSG_MAP

ID	Data Element 39	Size 39	Data Element 40	Size 40
1		0		0
2		0		0
3		0		0
4		0		0
5		0		0
6		0		0
7		0		0
8		0		0
9		0		0
10		0		0
11		0		0
12		0		0
13		0		0
14		0		0
15		0		0
16		0		0
17		0		0
18		0		0
19		0		0
20		0		0
21		0		0
22		0		0
23		0		0
24		0		0
25		0		0
26		0		0
27	Driver_oss_Flag	1	CRC	16
28		0		0
29		0		0
30		0		0
31		0		0
32		0		0
33		0		0
34		0		0
35		0		0
36		0		0

MSG_MAP

ID	Physical Flow	Architecture Flow	Message	Message Size
37	signal priority request		Vehicle ID Request	72
38	signal priority request	local signal priority request	Vehicle ID	88
39	signal priority request		Signal Priority Response	104
40	vehicle probe data		Request Vehicle Probe Data	80
41	vehicle probe data	probe data	Vehicle Probe Data	193
42	intersection status		Vehicle ID Request	72
43	intersection status	intersection status	Vehicle ID	193
44	intersection status		Intersection Status	116
45	off-line verification		Off-Line Verification	80
46	off-line verification		Verification Data	712
47	off-line verification		Verification Event	312
48	AHS vehicle data		Vehicle ID Request	72
49	AHS vehicle data	AHS vehicle data	AHS vehicle condition	1241
50	AHS check response		Vehicle ID Request	72
51	AHS check response		Vehicle ID	205
52	AHS check response	AHS check response	AHS data	4153
53	AHS control data update		Vehicle ID Request	72
54	AHS control data update		Vehicle ID	205
55	AHS control data update	AHS control data update	AHS route data	4152
56	Speed and Headway		Speed and Headway Request	72
57	Speed and Headway	AHS management information	Speed and Headway	110
58	transit fleet status		Transit fleet status data ready	64
59	transit fleet status	transit fleet status request	Transit fleet status request	72
60	transit fleet status	transit fleet status response	Transit fleet status response	696
61	traveler information	traveler information requests	Other Services Vehicle Request	2456
62	traveler information	traveler information responses	Other Services Vehicle Response	2456
63	fare enforcement		Request Fare collection vehicle violation information	72
64	fare enforcement	fare payment and status	Fare collection vehicle violation information	480
65	fare enforcement	schedules, fare info, and request processing	Request transit user image	88
66	fare enforcement	fare payment and status	Transit user vehicle image	73784
67	advance payment for services		Request Transit Vehicle Advanced Payment Info	72
68	advance payment for services	fare payment and status	Transit Vehicle Advanced Payment Request	1288
69	advance payment for services	schedules, fare info, and request processing	Transit Vehicle Advanced Payment Response	376
70	transit vehicle passenger and use data		Request transit management data update	72
71	transit vehicle passenger and use data	vehicle measures and vehicle probe data	Transit management data update	2944
72	driver instructions	driver instructions	Driver instructions	9272

MSG_MAP

ID	Src	Dst	Data Element 1	Size 1	Data Element 2	Size 2	Data Element 3	Size 3	Data Element 4	Size 4
37	RS	TRVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
38	TRVS	RS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
39	RS	TRVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
40	RS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
41	VS	RS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
42	RS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
43	VS	RS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
44	RS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
45	CVCS	CVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
46	CVS	CVCS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
47	CVCS	CVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
48	RS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
49	VS	RS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
50	RS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
51	VS	RS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
52	RS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
53	RS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
54	VS	RS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
55	RS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
56	RS	VS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
57	VS	RS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
58	TRMS	TRVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
59	TRVS	TRMS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
60	TRMS	TRVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
61	TRMS	TRVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
62	TRVS	TRMS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
63	TRMS	TRVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
64	TRVS	TRMS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
65	TRMS	TRVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
66	TRVS	TRMS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
67	TRMS	TRVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
68	TRVS	TRMS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
69	TRMS	TRVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
70	TRMS	TRVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
71	TRVS	TRMS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12
72	TRMS	TRVS	Selsyn	8	Flag	4	Transaction_Type	16	Message_Length	12

MSG_MAP

ID	Data Element 5	Size 5	Data Element 6	Size 6	Data Element 7	Size 7
37	State/Region	8	Group/Agency	8	CRC	16
38	Signal Priority Request	2	Time	18	Agency_Specific_Data	12
39	Password	18	Reader_ID	12	Seconds	18
40	State/Region	8	Group/Agency	8	Transaction Code	8
41	Vehicle_Identification_Number	119	Seconds	18	CRC	16
42	State/Region	8	Group/Agency	8	CRC	16
43	Vehicle_Identification_Number	119	Seconds	18	CRC	16
44	Password	18	Reader_ID	12	Seconds	18
45	State/Region	8	Group/Agency	8	Transaction Code	8
46	Motor_Carrier_ID	49	Vehicle_Identification_Number	119	Vehicle_Identification_Number	119
47	Verifcation_Event_Status	256	CRC	16		0
48	State/Region	8	Group/Agency	8	CRC	16
49	Vehicle_Identification_Number	119	Seconds	18	ahs_data_input	16
50	State/Region	8	Group/Agency	8	CRC	16
51	Vehicle_Identification_Number	119	Seconds	18	Agency_Specific_Data	12
52	ahs_demand_accel_decel_profile	2048	ahs_demand_headway	2048	confirmation_flag	1
53	State/Region	8	Group/Agency	8	CRC	16
54	Vehicle_Identification_Number	119	Seconds	18	Agency_Specific_Data	12
55	ahs_demand_accel_decel_profile	2048	ahs_demand_headway	2048	CRC	16
56	State/Region	8	Group/Agency	8	CRC	16
57	speed	16	headway	8	Seconds	18
58	transit_fleet_status_data_ready	8	CRC	16		0
59	transit_conditions_request	16	CRC	16		0
60	transit_vehicle_conditions	640	CRC	16		0
61	other_services_vehicle_request	2400	CRC	16		0
62	other_services_vehicle_response	2400	CRC	16		0
63	request_fare_collection_vehicleViolation_information	16	CRC	16		0
64	fare_collection_vehicleViolation_information	424	CRC	16		0
65	request_transit_user_image	32	CRC	16		0
66	transit_user_vehicle_image	73728	CRC	16		0
67	request_transit_vehicle_advanced_payment	16	CRC	16		0
68	transit_vehicle_advanced_payment_request	1232	CRC	16	.	0
69	transit_vehicle_advanced_payment_response	320	CRC	16		0
70	request_transit_management_pushed_data_update	16	CRC	16		0
71	paratransit_transit_vehicle_availability	8	transit_vehicle_collected_trip_data	272	transit_vehicle_passenger_data	224
72	approved_corrective_plan	8192	paratransit_transit_driver_instructions	1024	CRC	16

MSG_MAP

ID	Data Element 8	Size 8	Data Element 9	Size 9	Data Element 10	Size 10	Data Element 11
37		0		0		0	
38	CRC	16		0		0	
39	CRC	16		0		0	
40	CRC	16		0		0	
41		0		0		0	
42		0		0		0	
43		0		0		0	
44	Intersection Status	12	CRC	16		0	
45	CRC	16		0		0	
46	Driver_ID	92	Commodity_Code	4		0	Vehicle_Out-of-Service_Status *
47		0		0		0	
48		0		0		0	
49	ahs_vehicle_data	8	ahs_vehicle_condition	1024	CRC	16	
50		0		0		0	
51	CRC	16		0		0	
52	CRC	16		0		0	
53		0		0		0	
54	CRC	16		0		0	
55		0		0		0	
56		0		0		0	
57	Agency_Specific_Data	12	CRC	16		0	
58		0		0		0	
59		0		0		0	
60		0		0		0	
61		0		0		0	
62		0		0		0	
63		0		0		0	
64		0		0		0	
65		0		0		0	
66		0		0		0	
67		0		0		0	
68		0		0		0	
69		0		0		0	
70		0		0		0	
71	transit_vehicle_arrival_conditions	1024	transit_vehicle_deviations_from_schedule	256	transit_vehicle_eta	216	transit_vehicle_location
72		0		0		0	

MSG_MAP

ID	Size 11	Data Element 12	Size 12	Data Element 13	Size 13	Data Element 14	Size 14
37	0		0		0		0
38	0		0		0		0
39	0		0		0		0
40	0		0		0		0
41	0		0		0		0
42	0		0		0		0
43	0		0		0		0
44	0		0		0		0
45	0		0		0		0
46	1	Driver_Out-of-Service_Status *	1	Last_Clearance_Site_Passed	18	Time_when_site_was_passed	32
47	0		0		0		0
48	0		0		0		0
49	0		0		0		0
50	0		0		0		0
51	0		0		0		0
52	0		0		0		0
53	0		0		0		0
54	0		0		0		0
55	0		0		0		0
56	0		0		0		0
57	0		0		0		0
58	0		0		0		0
59	0		0		0		0
60	0		0		0		0
61	0		0		0		0
62	0		0		0		0
63	0		0		0		0
64	0		0		0		0
65	0		0		0		0
66	0		0		0		0
67	0		0		0		0
68	0		0		0		0
69	0		0		0		0
70	0		0		0		0
71	232	transit_vehicle_location_for_deviation	232	transit_vehicle_location_for_store	232	transit_vehicle_schedule_deviation	192
72	0		0		0		0

MSG_MAP

ID	Data Element 15	Size 15	Data Element 16	Size 16	Data Element 17	Size 17	Data Element 18	Size 18
37		0		0		0		0
38		0		0		0		0
39		0		0		0		0
40		0		0		0		0
41		0		0		0		0
42		0		0		0		0
43		0		0		0		0
44		0		0		0		0
45		0		0		0		0
46	Gross_vehicle_weight	8	No._of_Axes	4	Weight_per_Axle	96	Spacing_between_Axes	112
47		0		0		0		0
48		0		0		0		0
49		0		0		0		0
50		0		0		0		0
51		0		0		0		0
52		0		0		0		0
53		0		0		0		0
54		0		0		0		0
55		0		0		0		0
56		0		0		0		0
57		0		0		0		0
58		0		0		0		0
59		0		0		0		0
60		0		0		0		0
61		0		0		0		0
62		0		0		0		0
63		0		0		0		0
64		0		0		0		0
65		0		0		0		0
66		0		0		0		0
67		0		0		0		0
68		0		0		0		0
69		0		0		0		0
70		0		0		0		0
71	CRC	16		0		0		0
72		0		0		0		0

MSG_MAP

ID	Data Element 19	Size 19	Data Element 20	Size 20	Data Element 21	Size 21	Data Element 22	Size 22
37		0		0		0		0
38		0		0		0		0
39		0		0		0		0
40		0		0		0		0
41		0		0		0		0
42		0		0		0		0
43		0		0		0		0
44		0		0		0		0
45		0		0		0		0
46	Bypass_status_from_Last_Reader	1	CRC	16		0		0
47		0		0		0		0
48		0		0		0		0
49		0		0		0		0
50		0		0		0		0
51		0		0		0		0
52		0		0		0		0
53		0		0		0		0
54		0		0		0		0
55		0		0		0		0
56		0		0		0		0
57		0		0		0		0
58		0		0		0		0
59		0		0		0		0
60		0		0		0		0
61		0		0		0		0
62		0		0		0		0
63		0		0		0		0
64		0		0		0		0
65		0		0		0		0
66		0		0		0		0
67		0		0		0		0
68		0		0		0		0
69		0		0		0		0
70		0		0		0		0
71		0		0		0		0
72		0		0		0		0

MSG_MAP

ID	Data Element 23	Size 23	Data Element 24	Size 24	Data Element 25	Size 25	Data Element 26
37		0		0		0	
38		0		0		0	
39		0		0		0	
40		0		0		0	
41		0		0		0	
42		0		0		0	
43		0		0		0	
44		0		0		0	
45		0		0		0	
46		0		0		0	
47		0		0		0	
48		0		0		0	
49		0		0		0	
50		0		0		0	
51		0		0		0	
52		0		0		0	
53		0		0		0	
54		0		0		0	
55		0		0		0	
56		0		0		0	
57		0		0		0	
58		0		0		0	
59		0		0		0	
60		0		0		0	
61		0		0		0	
62		0		0		0	
63		0		0		0	
64		0		0		0	
65		0		0		0	
66		0		0		0	
67		0		0		0	
68		0		0		0	
69		0		0		0	
70		0		0		0	
71		0		0		0	
72		0		0		0	

MSG_MAP

ID	Data Element 27	Size 27	Data Element 28	Size 28	Data Element 29	Size 29	Data Element 30	Size 30
37		0		0		0		0
38		0		0		0		0
39		0		0		0		0
40		0		0		0		0
41		0		0		0		0
42		0		0		0		0
43		0		0		0		0
44		0		0		0		0
45		0		0		0		0
46		0		0		0		0
47		0		0		0		0
48		0		0		0		0
49		0		0		0		0
50		0		0		0		0
51		0		0		0		0
52		0		0		0		0
53		0		0		0		0
54		0		0		0		0
55		0		0		0		0
56		0		0		0		0
57		0		0		0		0
58		0		0		0		0
59		0		0		0		0
60		0		0		0		0
61		0		0		0		0
62		0		0		0		0
63		0		0		0		0
64		0		0		0		0
65		0		0		0		0
66		0		0		0		0
67		0		0		0		0
68		0		0		0		0
69		0		0		0		0
70		0		0		0		0
71		0		0		0		0
72		0		0		0		0

MSG_MAP

ID	Data Element 31	Size 31	Data Element 32	Size 32	Data Element 33	Size 33	Data Element 34	Size 34
37		0		0		0		0
38		0		0		0		0
39		0		0		0		0
40		0		0		0		0
41		0		0		0		0
42		0		0		0		0
43		0		0		0		0
44		0		0		0		0
45		0		0		0		0
46		0		0		0		0
47		0		0		0		0
48		0		0		0		0
49		0		0		0		0
50		0		0		0		0
51		0		0		0		0
52		0		0		0		0
53		0		0		0		0
54		0		0		0		0
55		0		0		0		0
56		0		0		0		0
57		0		0		0		0
58		0		0		0		0
59		0		0		0		0
60		0		0		0		0
61		0		0		0		0
62		0		0		0		0
63		0		0		0		0
64		0		0		0		0
65		0		0		0		0
66		0		0		0		0
67		0		0		0		0
68		0		0		0		0
69		0		0		0		0
70		0		0		0		0
71		0		0		0		0
72		0		0		0		0